

WHAT IS CLAIMED IS:

1. A fuel feed apparatus disposed in a fuel tank, the fuel feed apparatus comprising:

a sub-tank that is received in the fuel tank;

a pump module that is received in the sub-tank and includes:

a fuel pump that pumps fuel, which is supplied from the fuel tank to the sub-tank; and

a suction filter that is placed below the fuel pump in a vertical direction and is connected to the fuel pump and to a bottom inner wall of the sub-tank on an opposite side with respect to the fuel pump, wherein the suction filter removes debris from fuel to be supplied to the fuel pump; and

at least one supporting member that has resiliency and supports the fuel pump in cooperation with the sub-tank at a location, which is above the suction filter in the vertical direction.

2. The fuel feed apparatus according to claim 1, wherein the pump module further includes a casing, which accommodates the fuel pump.

3. The fuel feed apparatus according to claim 2, wherein the pump module further includes a filter element, which surrounds the fuel pump and removes debris from fuel discharged from the fuel pump.

4. The fuel feed apparatus according to claim 1, wherein the at least one supporting member connects with the pump module at a location, which is above a center of gravity of the pump module.

5. The fuel feed apparatus according to claim 1, wherein the at least one supporting member connects with a top end surface of the pump module.

6. The fuel feed apparatus according to claim 1, wherein the suction filter includes a nonwoven fabric material disposed along an outer peripheral surface of the suction filter.

7. The fuel feed apparatus according to claim 1, wherein the suction filter includes a filtering material, which removes debris from fuel and has a bottom section that contacts the bottom inner wall of the sub-tank.

8. The fuel feed apparatus according to claim 1, further comprising an elastic member, which contacts the bottom inner wall of the sub-tank, wherein a bottom section of the suction filter contacts the elastic member.

9. The fuel feed apparatus according to claim 8, wherein:

a contact surface of the suction filter, which contacts the elastic member, has one of a concave surface section and a convex surface section;

a contact surface section of the elastic member, which contacts the suction filter, has the other one of the concave surface section and the convex surface section; and

the concave surface section has a decreasing inner diameter that linearly decreases toward a bottom of the concave surface section.

10. The fuel feed apparatus according to claim 9, wherein the elastic member and the pump module are substantially coaxially arranged.

11. The fuel feed apparatus according to claim 1, wherein the at least one supporting member connects with the sub-tank at a plurality of connecting positions, which are spaced from one another in a circumferential direction.

12. The fuel feed apparatus according to claim 11, wherein:

the plurality of connecting positions of the at least one supporting member includes at least three connecting positions; and

a central axis of the pump module is located within an imaginary polygon, which has a plurality of vertexes, each of which is located in a corresponding one of the at least three

connecting positions of the at least one supporting member.

13. The fuel feed apparatus according to claim 1, wherein the at least one supporting member is snap fit to at least one of the pump module and the sub-tank.

14. The fuel feed apparatus according to claim 1, wherein:

the at least one supporting member is snap fit to the sub-tank;

each of the at least one supporting member includes a sub-tank side connecting portion, which is snap fit to the sub-tank and includes an outer peripheral section and an inner peripheral section; and

a peripheral wall of the sub-tank is held between the outer peripheral section and the inner peripheral section of each of the at least one supporting member.

15. The fuel feed apparatus according to claim 1, wherein each of the at least one supporting member includes a connecting portion, which connects between the pump module and the sub-tank and has a wave shape.

16. The fuel feed apparatus according to claim 1, wherein each of the at least one supporting member includes a sub-tank side connecting portion, which is engaged with the sub-tank and generally extends in an installation direction of

the pump module to the sub-tank.

17. The fuel feed apparatus according to claim 1, wherein an axial direction of the fuel pump coincides with an axial direction of the sub-tank.

18. The fuel feed apparatus according to claim 1, wherein:

the suction filter includes a filtering material and an inlet pipe; and

the inlet pipe extends linearly in an axial direction of the pump module.

19. The fuel feed apparatus according to claim 18, wherein an inner diameter of the inlet pipe is greater than an axial length of the inlet pipe.

20. The fuel feed apparatus according to claim 18, wherein the inlet pipe and the pump module are substantially coaxially arranged.

21. The fuel feed apparatus according to claim 2, wherein the casing has a peripheral wall formed in a mesh-shape or a lattice-shape.